

GROUND WATER/GEOCHEMICAL MONITORING ABOVE THE CONFINING ZONE [40 CFR 146.90(d)]

Monitoring Category and Class VI Rule Citation	Target Formation	Monitoring Activity	Data Collection Location(s)	Spatial Coverage or Depth	Frequency (Baseline)	Frequency (Injection Phase)	Frequency (Post-Injection Phase)	T&M Strategy Questions/Responses
Ground Water Monitoring Above Confining Zone [40 CFR 146.90(d)]	Quaternary / Shallow strata sources of drinking water	Fluid sampling	Shallow monitoring wells GW1, GW2, GW3, GW4	4 shallow monitoring wells each with one sampling interval	Quarterly for a period of at least 1 yr prior to injection	Quarterly	Quarterly 3-5 years post injection, Annual afterwards	Establish a baseline for normal variances and monitor ground water quality and geo-chemical changes
	Santa Margarita or base of USDW	Fluid sampling	Mendota USDW 1	1 point location	Quarterly for a period of at least 1 yr prior to injection	Quarterly	Quarterly 3-5 years post injection, Annual afterwards	Establish a baseline for normal variances and monitor ground water quality and geo-chemical changes
	Garzas, or 1st permeable formation above Moreno Main seal	Fluid sampling	Mendota ACZ 1	1 point location	Sample during well construction, one add'l sample prior to injection	Annual	Annual years 1-3, years 5, 7 & 10	Establish a baseline and monitor 1st permeable above confining zone water quality and geo-chemical changes
Indirect Monitoring Above Confining Zone	Garzas to surface	DAS – Distributed Temperature / Acoustic	Mendota ACZ 1	Distributed measurement	Continuous	Continuous	Continuous for 3 years	Monitor well integrity and any potential movement of fluids outside of zone
	1st Panoche to surface	DAS – Distributed Temperature / Acoustic	Mendota OBS 1	Distributed measurement	Continuous	Continuous	Continuous for 3 years	Monitor well integrity and any potential movement of fluids outside of zone
	1st Panoche to surface	DAS – Distributed Temperature / Acoustic	Mendota INJ 1	Distributed measurement	Continuous	Continuous	Continuous for 3 years	Monitor well integrity and any potential movement of fluids outside of zone
	Garzas to surface casing ~1800 ft	Pulsed Neutron Monitoring	Mendota ACZ 1	Survey Log	1 Baseline	Quarterly to year 1.5, Annual afterwards	Years 1,3,5,7 and 10	Monitor well integrity and any potential movement of fluids outside of zone
	Garzas to surface casing ~1800 ft	Pulsed Neutron Monitoring	Mendota OBS 1	Survey Log	1 Baseline	Quarterly to year 1.5, Annual afterwards	Years 1,3,5,7 and 10	Monitor well integrity and any potential movement of fluids outside of zone

INTRODUCTION

This file is intended to summarize **Clean Energy Systems - Mendota** testing and monitoring strategy to comply with the Class VI requirements under:

- 40 CFR 146.90(d) for geochemical monitoring above the confining zone; and
- 40 CFR 146.90(g) for plume and pressure front monitoring.

Please review the contents of all of the tables and confirm that they are accurate.

NOTES

[For example, This spreadsheet has been populated using the following sources..., Red text is used to flag items for which EPA is requesting additional clarification..., etc.]

PLUME MONITORING [40 CFR 146.90(g)]

Monitoring Category and Class VI Rule Citation	Target Formation	Monitoring Activity	Data Collection Location(s)	Spatial Coverage or Depth	Frequency (Baseline)	Frequency (Injection Phase)	Frequency (Post-Injection Phase)	T&M Strategy Questions/Responses
Plume Monitoring [40 CFR 146.90(g)] DIRECT MONITORING	2nd Panoche Sand	Fluid sampling	Mendota OBS 1	1 point location	Sample during well construction, one add'l sample prior to injection	Annual	Annual years 1-3, years 5, 7 & 10	Establish a baseline and monitor plume
	Injection log (Spinner) survey	Injection profile	Mendota INJ 1	Survey Log	N/A	As required	N/A	Establish injection profile
	CO ₂ chemistry into 2nd Panoche Sand	CO2 injectate chemistry	Surface	1 point location	N/A	Quarterly	N/A	CO ₂ Chemistry
Plume Monitoring [40 CFR 146.90(g)] INDIRECT MONITORING	Panoche to surface casing ~1800 ft	Pulsed Neutron Monitoring	Mendota OBS 1	Survey Log	1 Baseline	Quarterly to year 1.5, Annual afterwards	Years 1,3,5,7 and 10	Monitor formation CO ₂ at observation well for AoR reservoir model history matching, well integrity.
	Panoche to surface casing ~1800 ft	Pulsed Neutron Monitoring	Mendota INJ 1	Survey Log	1 Baseline	Quarterly to year 1.5, Annual afterwards	Years 1,3,5,7 and 10	Monitor formation CO ₂ at injection well for AoR reservoir model history matching, well integrity.
	AoR	3D surface, or combination of borehole and surface seismic	Various	AoR	1 pre-construction baseline 3D survey and 1 VSP survey in INJ1 & OBS 1	Year 3 and as needed	Years 1, 5 and 10	Monitor Plume AoR migration
		Time-lapse VSP survey	Mendota OBS 1	~100 to 2000 acres	Baseline during well construction	Years 2,3 and 4	None	Monitor Plume AoR migration

PRESSURE-FRONT MONITORING [40 CFR 146.90(g)] AND OTHER RELATED MONITORING

Monitoring Category and Class VI Rule Citation	Target Formation	Monitoring Activity	Data Collection Location(s)	Spatial Coverage or Depth	Frequency (Baseline)	Frequency (Injection Phase)	Frequency (Post-Injection Phase)	T&M Strategy Questions/Responses
Pressure-Front Monitoring [40 CFR 146.90(g)] DIRECT MONITORING	Panoche Sands 1, 2, and 3	Pressure/temperature monitoring	Mendota OBS 1	1 point location, 3 intervals	Baseline	Continuous	Continuous until year 3, Annually afterwards	AoR Plume migration, history match AoR reservoir model
	Panoche Injection Interval	Pressure/temperature monitoring	Mendota INJ 1	1 point location, 1 interval	Baseline	Continuous	Continuous until year 3, Annually afterwards	AoR Plume migration, history match AoR reservoir model
	Distributed Temperature Sensing (DTS)	Temperature monitoring	Mendota OBS 1	Distributed measurement	Baseline	Continuous	Continuous until year 3	AoR Plume migration, history match AoR reservoir model
	Distributed Temperature Sensing (DTS)	Temperature monitoring	Mendota INJ 1	Distributed measurement	Baseline	Continuous	Continuous until year 3	AoR Plume migration, history match AoR reservoir model
Pressure-Front Monitoring [40 CFR 146.90(g)] INDIRECT MONITORING	Panoche Injection Interval	Injection volume	Mendota INJ 1	surface	N/A	Continuous	N/A	AoR Plume migration, history match AoR reservoir model
Other Related Monitoring	Multiple	Passive Seismic	A combination of borehole and surface seismic stations located within the AoR	The passive seismic monitoring system to detect seismic events over M1.0 within the AoR	N/A	Continuous	Continuous	

[If desired, paste maps of monitoring sites on this tab for reference purposes]